

**VOLUNTARY MOBILE EMISSION SOURCE PROGRAM (VMEP)
STATE IMPLEMENTATION PLAN (SIP) ASSESSMENT**

2004 VMEP ASSESSMENT

FINAL REPORT

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EXECUTIVE SUMMARY

INTRODUCTION

This report presents the second assessment of commuter related travel and emission reductions that could be credited to Voluntary Mobile Source Emission Reduction Programs (VMEPs) in the Atlanta 13-county nonattainment area¹. VMEPs include transportation demand management (TDM) programs that encourage commuters and other travelers to voluntarily use alternative modes of transportation, an action that can help improve traffic congestion and air quality in a region. Atlanta's VMEP is a comprehensive TDM program that includes organizations such as The Clean Air Campaign, Transportation Management Associations (TMAs), and the Atlanta Regional Commission.

The Center for Transportation and the Environment (CTE) measurement team conducted the assessment on behalf of the Georgia Department of Transportation (GDOT) and the Georgia Department of Natural Resources, Environmental Protection Division (EPD). EPD estimated that 1.5% of the travel and emission reductions needed to bring the nonattainment area into compliance with federal air quality standards would come from VMEPs.² The VMEP estimate represents a daily reduction of 4.4 million vehicle miles, 4.28 tons of Oxides of Nitrogen (NO_x), and 6.51 tons of Volatile Organic Compounds (VOC) to be achieved by 2004, the attainment or compliance year. The VMEP targets are presented by EPD in the State Implementation (SIP) for the Atlanta region.

EPD stated in the SIP that they would conduct an annual evaluation to assess progress toward attaining the TDM emission reduction target. The first interim assessment, conducted in 2002, presented various approaches to assess vehicle miles traveled (VMT) and emission reductions from commute behavior changes that could be credited to VMEPs. The assessment provided an early indication of the region's likely ability to meet the SIP emissions reduction target and served as a test for using a regional survey as the primary data collection tool. The assessment did not recommend a particular approach, but instead presented suggestions for how the evaluation methodologies could be improved in subsequent assessments. The second assessment, conducted in May 2004, includes all but one of the suggested improvements. A summary of this assessment is provided below.

VMEP TRAVEL AND EMISSION REDUCTION ESTIMATES

Similar to the 2002 assessment, the measurement team used a regional transportation survey (Regional Switcher Survey) to assess the commute changes. The survey involved interviewing Atlanta area commuters to estimate the percentage who had made travel changes since 1990, the SIP baseline year. Based on the experiences gained from the 2002 assessment, the measurement team focused on two evaluation approaches for the 2004 assessment, both of which are briefly described below and in more detail on the subsequent pages.

All Commute Changes During the Evaluation Period

The first approach accounts for the full range of commute change impacts that occurred in the region since the SIP baseline year (1990), providing a true regional assessment of behavior change. It counts both commute changes that reduce weekly vehicle trips (e.g., single occupant vehicle (SOV) to transit or carpool to transit) and commute changes that increase weekly vehicle trips (e.g., transit to carpool or

¹ Thirteen (13) county nonattainment area includes Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Paulding, and Rockdale counties.

² USEPA allows up to three percent of the necessary emission reduction amount to be achieved through Voluntary Mobile Source Emission Reduction Programs (VMEP).

carpool to SOV). It does not, however, consider the motivation for commute changes, nor does it consider if VMEPs influenced the changes. Travel and emission reduction estimates from this approach fall short of the VMEP targets. Daily travel reductions range from 913,200 to 1.2 million vehicle miles per day, while daily emission reductions range from .929 to 1.25 tons per day for NO_x and from 1.26 to 1.52 tons per day for VOC.

Alternative Mode Changes and Attribution to VMEPs

The second approach estimates impacts for commute changes associated with alternative mode switching. This approach makes the assumption that switches to drive alone should not be counted because they likely were not the result of VMEPs, but rather the result of changes in commuters' personal circumstances (e.g., changing jobs) or other personal travel needs or preferences. Because it is possible some switches to alternative modes were motivated by non-VMEP factors, this approach takes the further step of examining why commuters made alternative mode switches and the potential influence of VMEPs on the commute changes.

This approach considered two tiers of possible VMEP influence. Tier One influences account for the influences from direct receipt of or contact with a VMEP service or program (e.g., transit subsidy, employer commute assistance). Tier Two influences account for the potential influences that might be occurring due to a VMEP message (e.g., teleworking saves time, carpooling saves money) disseminated by VMEP partners. Tier Two also includes actions that might have been indirectly influenced by a VMEP service or program (e.g., family member, friend, coworker wanted to carpool).

Travel and emission reduction results for this approach also fall short of the VMEP targets, but are much closer than the first approach described above. Daily travel reductions range from 1.1 million to 3.2 million vehicle miles per day, while daily emission reductions range from 1.13 to 3.24 tons per day for NO_x and from 1.37 to 3.93 tons per day for VOC.

While this approach captures many of the impacts resulting from VMEPs, it may exclude some of the subconscious effects or indirect impacts of VMEPs that are not immediately evident or obvious to individuals making commute changes. It is also possible that some impacts counted under Tier Two could have no connection with the VMEPs at all. Finally, some of the Tier One and Tier Two influences may already be included in the regional travel demand model for the region, and thus might already be counted in the VMEP target baseline assessment.

FY2004 Atlanta TDM Program Evaluation

In addition to the VMEP assessment conducted through the Regional Switcher Survey, GDOT sponsors an annual evaluation to measure travel and emission reductions for commuters who participate in TDM programs that receive Congestion Mitigation and Air Quality Improvement (CMAQ) funds. While the annual Atlanta TDM Program evaluation is not conducted for the VMEP target assessment specifically, the measurement team has included it in this report as support data for the Regional Switcher Survey commute travel and emission reduction findings.

The fiscal year 2004 (FY2004) evaluation included commuter related travel and emission reductions from the 1-87-RIDEFIND participants, vanpool riders, monthly transit pass recipients, and The Clean Air Campaign Cash for Commuter's program participants. The travel and emission reductions include commuters who began using alternative modes or increased their frequency of alternative mode use during FY2004 and commuters who began using alternative modes prior to FY2004 and maintained use of the alternative modes during the year. The travel and emission reductions for the annual Atlanta TDM

Program evaluation, which include reductions in 41,021 vehicle trips, 885,791 vehicle miles, .7219 tons per day of NO_x, and .8755 tons per day of VOC, are also lower than the projected VMEP targets.

It is important to note, however, that the Atlanta TDM Program evaluation includes only the programs that can be validated with established data sources. As such, the evaluation represents a conservative, lower bound estimate of commute related travel and emission reductions. In addition, the evaluation represents alternative mode use over a shorter time period than the VMEP target evaluation period in the SIP (1990 baseline).

CONCLUSIONS

While the travel and emission reductions estimated from the 2004 evaluation approaches fall short of the VMEP targets, it does not mean that VMEP programs are not successful or effective at reducing traffic congestion and improving air quality in the 13-county Atlanta nonattainment area.

As demonstrated in the annual Atlanta TDM Program Evaluation, these programs continue to contribute to travel and emission reductions. For example, in 2002, the Atlanta TDM Program Evaluation was reducing approximately 780,000 vehicle miles per day. In 2004, the daily vehicle mile reduction estimates increased to nearly 886,000 miles per day.

The VMEP shortfalls likely have more to do with the difficulty in respondents' ability to recall the commute changes they have made over such a long period of time (since the SIP baseline year of 1990) and to identify why they have made commute changes in the first place (i.e., indirect and subconscious affects). Research shows that many commuters are prompted to make commute changes, but are not fully aware of VMEP influences on them or on their rideshare partners.

In addition, the 2004 estimate does not include potential impacts from non-commute travel changes. Non-commute data collected as part of the 2002 assessment indicated metro Atlanta residents make significant changes in non-commute travel each year. However, the measurement team was unable to collect non-commute data for the 2004 assessment, primarily because of data reliability concerns and the resources needed to accurately assess non-commute trip purposes.

Perhaps the most accurate measure of the VMEP target would be to collect commute and non-commute travel related data from the over 600 employer and property manager partners participating in VMEP programs across the Atlanta nonattainment area. However, the costs associated with conducting such an analysis is also cost prohibitive.

SECTION 1 OVERVIEW

PURPOSE OF THE REPORT

In fiscal year 2001 the measurement team began developing a methodology to assess the 13-county Atlanta nonattainment area's fulfillment of the 2004 travel and emission reduction goals established in the State Implementation Plan (SIP) for Voluntary Mobile Source Emission Reduction Programs (VMEP). The methodology was developed on behalf of the Georgia Department of Transportation (GDOT) and the Georgia Department of Natural Resources, Environmental Protection Division (EPD).

The U.S. Environmental Protection Agency (USEPA) allows states or metropolitan areas to project in a SIP that up to 3% of the necessary travel and emission reductions will be achieved through VMEPs. VMEPs include transportation demand management (TDM) programs that encourage commuters and other travelers voluntarily to use alternative modes of transportation for their travel, an action that can help reduce traffic congestion and improve air quality in a region. Atlanta's VMEP is a comprehensive TDM program that includes organizations such as The Clean Air Campaign, Transportation Management Associations (TMAs), and the Atlanta Regional Commission.

EPD has estimated that 1.5% of the travel and emission reductions needed in the SIP for the Atlanta region for 2004, the attainment year, would come from voluntary programs. This reduction represents a daily reduction of 4.28 tons of NO_x and 6.51 tons of VOC, to be achieved by reducing 4.4 million miles of travel.

The first interim assessment, conducted in FY2002, presented various approaches to assess vehicle miles traveled (VMT) and emission reductions from commute behavior changes that could be credited to VMEPs. The assessment provided an early indication of the region's likely ability to meet the SIP emissions reduction target and served as a test for using a regional survey as the primary data collection tool. The FY2002 assessment did not recommend a particular approach, but instead presented suggestions for how the methodologies could be improved in subsequent assessments. In 2004, the measurement team implemented the recommended changes and conducted a second Regional Switcher Survey. This report presents the findings of the 2004 survey.

ORGANIZATION OF THE REPORT

The report is divided into four sections.

- Section 1 – Purpose and organization of the report
- Section 2 – Description and findings of 2004 Regional Switcher Survey
- Section 3 – Description and findings of FY2004 Atlanta TDM Program Evaluation
- Section 4 - Conclusions

The report also includes the following appendices:

- Appendix A – 2004 Regional Switcher Survey Summary Report
- Appendix B – FY2004 Atlanta TDM Program Evaluation Summary Report

SECTION 2 2004 REGIONAL SWITCHER SURVEY

PURPOSE

The purpose of the regional switcher survey was to assess regional commute changes occurring in the 13-county metropolitan Atlanta nonattainment area since 1990. The measurement team collected data from the following three survey groups to assess commute changes:

- **Alternative Mode Switchers** - Respondents who started using a new alternative mode, increased use or frequency of an alternative mode, or increased carpool occupancy to travel to and from work since 1990.
- **Drive Alone Switchers** - Respondents who started driving alone or increased their frequency of driving alone and did not make a switch to an alternative mode to travel to and from work since 1990.
- **Non-Switchers** - Respondents who did not make any changes in how they travel to and from work since 1990.

The measurement team asked each group detailed questions about their commute travel and then used the findings to estimate the associated travel and emission reductions and to assess attainment of the VMEP target. A copy of the full 2004 Regional Switcher Survey Report can be found in Appendix A. The report includes a detailed description of the data collection methodology, survey findings, and travel and emission reductions. A summary of the report is presented below.

METHODOLOGY

Setting the SIP Target

In June 2001, EPD presented one of several possible scenarios for how the region might meet the VMEP target. The scenario, included in Appendix XXV of the SIP, assumes 90% of the travel and emission reductions needed to meet the VMEP target would come from employees of Clean Air Campaign and TMA employer partners. EPD assumed the remaining 10% of travel and emission reductions needed to meet the VMEP target would come from commuters not affiliated with The Clean Air Campaign or the TMAs, referred to as “collateral” reductions.

Using the VMT target of a daily reduction of 4.4 million vehicle miles, a 30 mile average round trip length, and the 90/10 allocation between partner and “collateral” impacts, EPD determined that 132,645 Clean Air Campaign and TMA commuters and 14,739 unaffiliated commuters would need to be placed in alternative forms of transportation, with each commuter reducing 10 vehicle trips per week, by the 2004 attainment date. EPD estimated that the number of commuters placed in alternative modes would reduce 294,768 vehicle trips per day. The reduction in vehicle trips represents a daily reduction of 4.4 million vehicle miles, 4.28 tons of NO_x, and 6.51 tons of VOC.

REVISIONS TO THE 2002 REGIONAL SWITCHER SURVEY

The measurement team, in consultation with EPD, decided to conduct a regional transportation survey to provide a preliminary assessment of the VMEP target. A regional survey, conducted via the telephone, provided the best opportunity to assess both VMEP and “collateral” participation. The survey focused on commuters who had made a commute change to an alternative mode that reduced their number of weekly commute trips. These commuters, defined as “switchers”, were asked detailed questions about their travel patterns before and after the changes to collect data needed to calculate the VMT and emission reductions resulting from their commute changes.

The measurement team conducted, the first regional transportation survey in 2002 to test if a regional survey could be used to assess travel and emission reductions from VMEPs and to provide an early indication of the region's likely ability to meet the SIP target for VMEPs in 2004. Based on the 2002 survey findings, the measurement team made several suggestions to improve the survey tool and methodology. Suggestions included:

- Collecting current travel data and demographics on “drive alone switchers” and “non-switchers” to test if and how these respondents differed from alternative mode switchers;
- Collecting “prior” travel data for “drive alone switchers” so that EPD could include the full range of commute change impacts in the overall regional behavior change assessment;
- Including more detailed questions about why commuters made commute changes and the potential influence of VMEP related programs and services on the commute changes in order to examine causality more thoroughly; and,
- Asking more detailed questions about non-commute travel changes and questions about influence of VMEPs on these changes.

The measurement team successfully added the first three enhancements, but, with agreement from both EPD and GDOT, abandoned the idea of collecting non-commute data, primarily because of data reliability concerns. Survey administration costs and survey length would only allow a short series of non-commute questions and minimal probing on the type of changes made. In addition, the measurement team was concerned that the sample size would be insufficient to examine switches to alternative modes that are used infrequently for non-commute trips.

Other Notable Survey Revisions

Several other issues arose during the development of the questionnaire. Some of these issues had been addressed also in the 2002 survey, but were handled slightly differently for the 2004 survey. These issues include the following:

- Choice of evaluation time frame
- Switches made by respondents new to Atlanta or new to the workforce
- Restrict switch comparison to “just prior” mode
- Track only one current mode for purpose of identifying switching
- Calculation of vehicle trips for 9/80 schedules and teleworking less than one day per week

Evaluation Time Frame – As in the 2002 survey, the evaluation time frame was set as starting in 1990, the year used in the SIP as the baseline. EPD took forecasts of VMT for the target year of 2003 from the Atlanta Regional Commission regional travel model (then based on 1990 travel data) and estimated concomitant emissions. Subtracting the forecast emissions from the allowable emissions provides the total amount of emission reductions necessary to meet attainment. However, during the analysis of the survey data the measurement team examined more recent dates as possible start dates to track more closely with the implementation of regional VMEPs.

Switches by Respondents New to Atlanta or New to the Workforce – The measurement team defined respondents as switchers if they had made a mode, frequency, or occupancy changes since the baseline year of 1990. Forty-three percent of respondents started working in Atlanta after 1990. Comparing the year respondents started their current mode(s) against the year they started working in Atlanta identified switches for these respondents. Essentially, they were given an individual baseline year corresponding to

the year they entered the Atlanta workforce. Respondents who made a switch since this date were counted as switchers. The measurement team counted respondents who used only one mode the entire time in the Atlanta workforce as non-switchers, even though their mode start date was after 1990.

"Just Prior" Mode – It is likely that some respondents made multiple switches during the 14-year evaluation period, but the measurement team was concerned that respondents could have difficulty recalling specific travel details for multiple past modes. Therefore, the survey estimated impacts for switches only between the current mode(s) and the mode(s) used just prior to the most recent switch. So, if a respondent currently used transit and switched from carpool, this was the switch captured, even if the respondent made an earlier switch during the 14-year period from driving alone to carpool. While considered necessary to simplify the survey questioning and methodology, this approach might over- or under-estimate the net trip change by failing to track all changes over the full 14-year period. To examine the extent of multiple switching, the 2004 survey added a question to identify any other switches the respondent might have made, in addition to the most recent switch, within the past five years. The measurement team believed data from any earlier years would be too unreliable to include.

Track Only One Current Mode for Switching Purpose – Another simplifying approach was to ask only about the mode that was started most recently. As noted earlier, the survey asked respondents how long they had used each mode. If the respondent currently used more than one mode, the interviewer based switching tests on the mode used the shortest time. But if the respondent used two modes the same amount of time, the interviewer chose the one used most days per week. The two exceptions to this rule were if the tie was between drive alone and either compressed work schedules (CWS) or teleworking. Because these two alternative modes nearly always would have been used fewer days per week than drive alone, they were chosen over drive alone as the “most recent” mode for switching purposes.

Calculation of Vehicle Trips for 9/80 Schedules and Teleworking Less than One Day Per Week – The calculation of vehicle trips for the traditional alternative modes followed the usual convention when a mode was used in a typical week: transit, bike, and walk counted as zero trips, CWS and teleworking days counted as zero vehicle trips, and carpool and vanpool trips were assigned trip counts inversely proportional to the number of vehicle occupants.

Two modes, 9/80 CWS and teleworking one to three days per month could not be easily addressed in the typical week travel grids. Each travel grid included a placeholder day for these two options to ensure they were included in the current and previous weekly vehicle trip calculations. Interviewers asked respondents who mentioned these modes in a typical week how they would have commuted to work if they had not been teleworking or working a compressed work week. In the calculation of weekly trips the week that did not include the 9/80 day off or telework day was used as the base calculation. Then one-half a weekly vehicle trip was subtracted from the weekly total to account for one-day off or telework in alternate weeks.

2004 REGIONAL SWITCHER SURVEY OVERVIEW

Similar to the 2002 survey, the measurement team divided the 2004 survey into seven sections. The first six sections collected data to determine the survey group the respondents would fall within (alternative mode switcher, drive alone switcher, and non-switcher) and the type of changes made by alternative mode and drive alone switchers. The last section collected travel pattern change information and data on other variables for the three survey groups. The sections and their functions are briefly explained below.

1) Identifies Qualified Respondents (includes initial screening questions, asked of all respondents) – Screens for “qualified” commuters and defines years in Atlanta. Defines current

commute modes/frequency and creates “current travel grid.” Establishes carpool/vanpool occupancy.

2) Mode Switch Screeners (asked of all respondents) – Identifies respondents who switched to a new mode since 1990 or since they entered the Atlanta workforce. Defines previous mode (modes), and establishes mode frequency for a previous “typical week” (previous travel grid).

3) Frequency Switch Screeners (asked of respondents who did not make a mode change) – Identifies respondents who increased the frequency of mode use and establishes the mode frequency for a previous “typical week” (previous travel grid).

4) Occupancy Switch Screeners (asked of carpoolers who did not make a mode change or frequency change) – Identifies respondents who increased the occupancy of their carpool and identifies the previous occupancy of the carpool.

5) Past Travel Grid (established for all alternative mode users) – Establishes modes and frequencies of past mode use (or sets past mode use to be equal to current mode use for respondents who have not made a change).

6) Switcher Tests (all alternative mode users) – Compares the current travel grid with the previous travel grids (and current/previous carpool occupancy) to identify respondents who are either alternative mode switchers or drive alone switchers. Also identifies respondents who use carpool and made an occupancy switch. Defines “non-switchers” as respondents who did not make a commute pattern switch.

7) Additional Questions Asked of Switchers and a Sample of Non-Switchers –

- Influence on change (alternative mode and drive alone switchers)
- Travel patterns (all employed respondents) – alternative mode access, distance
- Demographic questions (all alternative mode and drive alone switchers and 495 non-switchers)

As shown in the sections 2 through 4, the measurement team separately identified the three types of switchers - mode switchers, frequency switchers, and occupancy switchers. They were addressed in this hierarchical manner for interview efficiency. If a respondent had made a qualified mode switch, questions to test for frequency and occupancy switches were not needed to know that the respondent was a switcher. If the respondent did not make a mode switch, the interviewer asked the respondent if he/she made a frequency change. If the respondent did not make a frequency switch, the interviewer asked the respondent if he/she made an occupancy change.

FINDINGS

The following sections summarize some of the key findings from the regional switcher survey, including commute mode split by percent of weekly trips, duration of mode use, the type of commute changes or switches made by respondents, and the influences of the commute changes.

Current Commute Mode Split by Percent of Weekly Trips

Table 1 summarizes the current mode split as the percentage of weekly trips made for all respondents, with telework and compressed schedules included as “modes.” As shown, respondents made the largest percentage of weekly trips driving alone (80%). Nearly one in ten (8%) weekly trips were carpool trips, while about 7% were either on a bus or train. The average one-way commute distance for respondents was 17 miles.

TABLE 1: COMMUTE MODE SPLIT BY PERCENT WEEKLY TRIPS
(n=1,206)

Commute Mode	Percentage of Weekly trips
Drive alone	80.0%
Carpool	7.8%
Vanpool	0.0%
Bus	3.2%
Train	2.9%
Bike	0.3%
Walk	1.1%
Telework	3.7%
Compressed Work Week	1.0%

TEST FOR SWITCH TYPE

The measurement team derived the results shown above from the “current travel grid” that showed, for each respondent, the modes used each day of the week to travel to and from work. The next step in the survey was to determine if respondents had made a mode switch, frequency switch, or occupancy change. As mentioned previously, interviewers examined mode switches first because it was expected that they would constitute the largest percentage of switches.

The survey method counted switches only if they had occurred since 1990 or since the respondent entered the workforce, if the respondents entered the Atlanta workforce after 1990. To minimize bias among respondents who might feel the interviewers wanted or did not want them to have made a mode shift, the survey did not directly ask about mode changes during these periods. Rather the survey compared the mode start date against 1990 or the work start date, whichever was earlier.

A question early in the survey established the respondents “baseline” year. Next, for the comparison, the survey determined the length of time respondents had used the modes mentioned in the current travel grid. As with the duration of working in Atlanta, several prompts were included, if necessary, to assist respondents to identify the approximate time of the switch. If the respondent had used more than one mode, the questions about duration were repeated for each. The results of this question are presented in Table 2.

TABLE 2: DURATION OF COMMUTE MODE USE

Alternative Mode	Percentage	
	Greater Than or Equal to 14 years	Less Than 14 years
Drive Alone (n=918)	28%	72%
Carpool (n=174)	3%	97%
Vanpool (n=1)	NA	100%
Bus (n=50)	NA	100%
Train (n=51)	10%	90%
Walk (n=22)	NA	100%
Bicycle (n=8)	15%	85%
Telework (1+ days/week) (n=91)	NA	100%
Telework (1-3 days/month) (n=159)	1%	99%
4/40 CWS (n=57)	NA	100%
9/80 CWS (n=24)	NA	100%
3/36 CWS (n=12)	NA	100%

Mode Switch Screening

For each respondent, the duration of mode use was compared against 168 months (14 years), the time elapsed since 1990, or the number of months since the respondent started working in the Atlanta region. If this comparison showed that the start date for the mode was less than 168 months or less than the time working in Atlanta, this respondent was considered a mode switcher. Interviewers asked these respondents follow-up questions to determine the modes used prior to this change and the weekly frequency of use of each mode. Six hundred forty seven (647) of the 1,206 survey respondents said they made a switch to an alternative mode or to drive alone during the evaluation period.

Interviewers asked respondents who said they made a mode switch what modes they had used before making the switch and how many days in a typical week they used the modes. These results were used to calculate the previous weekly vehicle trips for each respondent.

Frequency Switch Screening

If the comparison of the commute mode duration to the evaluation period showed that the time using the mode was greater than or equal to 168 months or equal to the time the respondent had worked in Atlanta, the respondent had not made a mode switch. The interviewer asked these respondents follow-up questions to determine if a frequency switch had occurred. These respondents were asked if they had increased or decreased the number of days per week that they used any of the current commute modes during the evaluation period. For interview efficiency, interviewers asked only about the commute modes respondents said they were currently using.

Sixty-four (64) of the 1, 206 survey respondents said they either increased or decreased the number of days they used current commute modes during the evaluation period. The majority of these respondents (52 out of 64) were drive alone commuters and the remaining 12 either increased or decreased their use of

alternative modes. The interviewers asked frequency switchers about their previous travel patterns, but with the modes unchanged from the current modes. As with mode switchers, the measurement team used the data in the previous travel grids to calculate previous weekly vehicle trips for frequency switchers.

Occupancy Switch Screening

Finally, interviewers asked respondents who were currently carpooling, but who said they had not made a mode or frequency shift, if they had increased or decreased the number of people riding in the carpool. There were no carpoolers who had been carpooling before the evaluation period started that had increased their carpool size. Therefore, there were no occupancy switchers identified in this survey. Interviewers did not ask vanpoolers this question; vanpool ridership can change frequently and riders might not be able to recall such changes accurately. Further, since vanpools already are assigned a quite small vehicle count (inversely proportional to the number of vanpool riders), the measurement team decided omitting vanpool occupancy changes would result in a very small loss of credit.

TEST FOR SWITCHER GROUP

The last section of switcher screening portion of the survey classified each respondent into one of the following survey groups by comparing the current and previous commute travel grids:

- Alternative mode switcher group - respondents who started using a new alternative mode, increased use of an alternative mode, or increased carpool occupancy;
- Drive alone switcher group - respondents who started driving alone or increased frequency of driving alone and did not make a switch to an alternative mode; and
- Non-switcher group - respondents who had not made any changes in mode, frequency, or occupancy. This group also included respondents who decreased the number of days they worked, for example shifting from a full-time to part-time schedule, but who did not start using an alternative mode or increase the frequency of alternative mode use.

As shown in Table 3, of the 1,206 respondents participating in the survey, the measurement team classified 502 in the alternative mode switcher group, 209 in the drive alone switcher group, and 495 in the non-switcher group.

TABLE 3: SURVEYS COMPLETED BY SWITCHER CATEGORY

Survey Groups	Completed Surveys (Sample Size)
Alternate Mode Switcher	502
Drive Alone Switcher	209
Non-Switcher	495

It should be noted that these numbers do not represent the proportions of the three groups in the overall commuting population. As explained earlier, the measurement team defined quotas for both the alternative mode switchers and drive alone switchers, of 400 and 200 completed interviews, respectively, to ensure an adequate sample of each of these two important groups. Some respondents were reclassified into different switch or non-switch groups after the initial interview period and the measurement team

decided to obtain additional alternative mode switcher interviews, thus the totals for these groups exceeded the minimum quotas.

When these raw samples were weighted to the total regional commute population, the final percentages of commuters in each of the three switch groups were as shown in Table 4. About one-third of the regional population had made a switch. About two in ten (22.4%) made a switch to an alternative mode and about one in ten (11.5%) made a switch to drive alone. The remaining two-thirds (66.1%) of the population had not made a switch since 1990 or since starting to work in Atlanta.

TABLE 4: PERCENTAGE OF REGIONAL COMMUTER POPULATION BY SWITCHER CATEGORY

Survey Groups	Percentage
Alternate Mode Switcher	22.4%
Drive Alone Switcher	11.5%
Non-Switcher	66.1%

Current and Previous Travel Calculations

The test for switching classification completed the screening portion of the survey. Following this classification, interviewers asked respondents questions pertinent to their switcher status. Prior to asking these remaining questions, interviewers used formulas programmed into the interview software to calculate the two travel variables, current weekly vehicle trips (CVT) and previous weekly vehicle trips (PVT). Interviewers used CVT and PVT to estimate changes in trips by switchers.

The software calculated CVT from the current travel grid provided by the respondents for either the last week or typical week travel questions (modes used by each day of the week) and PVT from the previous travel grid provided from the follow-up questions about modes used before a switch was made. For three groups of respondents, the previous travel grid was the same as the current travel grid. These groups included respondents who said they made an occupancy switch (no changes in modes or frequency of use), respondents who said they did not make any switches (no changes in mode, frequency, or occupancy), and respondents who said they were not working in Atlanta prior to starting to use their current modes.

CVT and PVT Comparison

Finally, the software compared CVT and PVT for each respondent. If PVT was greater than CVT, the respondent had reduced weekly vehicle trips. If PVT was less than CVT, the respondent had increased the number of weekly vehicle trips. And if PVT was equal to CVT, the respondent had neither increased nor decreased weekly vehicle trips.

In general, alternative mode switchers reduced their weekly vehicle trips, drive alone switchers increased vehicle trips, and non-switchers had made no change in vehicle trips. However, it is possible that some alternative mode switchers could have increased or maintained trips, if they switched from one alternative mode to another. For example, a respondent who switched from five-days of transit to five days of carpool would have increased weekly vehicle trips.

COMMUTE CHANGE OR SWITCH INFLUENCES

One of the last sections of the survey involved asking drive alone switchers and alternative mode switchers what influenced them to make changes in how they travel to and from work. Influences for these two groups are shown separately in Table 5. As expected, drive alone switchers were more likely to mention that the reason they switched was because they moved their residence or they or their spouse changed jobs (51% of drive alone switchers compared to 33% of alternative mode switchers). Also as expected, alternative mode switchers were more likely to mention that they switched because they wanted to save time or money and they did not want to drive because traffic was worse.

TABLE 5: COMMUTE CHANGE INFLUENCES (UNAIDED QUESTION) DRIVE ALONE SWITCHERS AND ALTERNATIVE MODE SWITCHERS

Influences	Percentage Drive Alone Switchers (n=209)	Percentage Alternative Mode Switchers (n=502)
Moved my home or changed jobs, spouse changed jobs	51%	33%
Wanted to save time	7%	14%
Didn't want to drive, traffic was worse	1%	13%
Wanted to save money	3%	11%
Spouse/family member, friend, co-worker wanted to carpool	NA	9%
Preferred to drive	9%	2%
Didn't have access to car/truck for regular use	2%	5%
Job/employer offered/required it	>1%	5%
Carpool/vanpool broke up, lost carpool/vanpool partner	12%	>1%
Work schedule changed/worked more/fewer days	8%	2%
Got access to car/truck for regular use	9%	1%
Concerned about the environment	>1%	4%
Received other commute service from employer	NA	3%
Like being able to work at home/more time with family	NA	3%
Didn't like using previous type of transportation	2%	1%
New type of transportation became available	>1%	2%
Parking cost too high	NA	1%
Started needing car before/during work	2%	>1%
New mass transit line became available	NA	1%
Transit service not available anymore	NA	>1%
Get an extra day off/one less day to commute	>1%	>1%

Influence of Commute Information or Services

Interviewers asked the 3% of alternative mode switchers (17 respondents) who said in the unaided question that they were influenced by a commute service from their employer what commute service they

had received. The overwhelming majority (14 of 17) of respondents who were asked this question said their employer had implemented a telework policy. A few also mentioned discount transit passes and prizes or contests for not driving alone. None of the drive alone switchers mentioned being influenced by a commute service from their employer.

In addition, alternative mode switchers who did not mention in the unaided question that an employer or commute assistance organization had influenced their commute change were asked directly if their change had been “influenced or encouraged” or “assisted” by commute information or services. About 14% of the 485 respondents who were asked this question said that they had received commute information or assistance from their employer or another organization that had influenced their change, while another 1% said that a commute information or service they received assisted them to make a change. When asked about the information or service that influenced or assisted in the change, just over half (53% of 70 respondents) mentioned telework information and about 13% mentioned carpool or vanpool subsidy or cash incentive. Another 7% each mentioned transit information or schedules or discounted transit passes.

TRAVEL AND EMISSION REDUCTIONS

Based on the experiences gained from the 2002 VMEP assessment, the measurement team decided to focus on two approaches for assessing travel and air quality emissions reductions for the 2004 assessment. These approaches and the associated travel and emission reductions are presented in Table 6 and Table 10.

All Commute Changes during the Evaluation Period - This approach accounts for the full range of commute change impacts that occurred in the region since the SIP baseline year (1990), providing a true regional assessment of behavior change. It counts both commute changes that reduce weekly vehicle trips (e.g., single occupant vehicle (SOV) to transit or carpool to transit) and commute changes that increase weekly vehicle trips (e.g., transit to carpool or carpool to SOV). It does not, however, consider the motivation for commute changes, nor does it consider if VMEPs influenced the changes.

This approach does consider two different evaluation periods. The first period covers the full 14 years from the SIP baseline year of 1990. The second period examines commute changes that occurred only during the past seven years (when the region implemented VMEPs in earnest). Specifically, the 7-year evaluation period begins at the time when the region initiated many of the current local and regional commute services, such as the regional rideshare database and state and federal employer commute assistance programs. It also includes the time period (2000) when the region initiated a large-scale media campaign and increased employer outreach to promote private sector employer commute assistance programs.

As shown in Table 6, the reductions in vehicle trips, vehicle miles, and emissions calculated for this approach fall short of the VMEP targets.

TABLE 6: DAILY TRAVEL AND EMISSION REDUCTIONS FOR ALL COMMUTE CHANGES

	Commuter Placements	Daily Vehicle Trips Reduced	Daily Vehicle Miles Reduced	Daily NO_x Reduced (tons)	Daily VOC Reduced (tons)
VMEP SIP Targets	147,384	294,768	4,421,487	4.28	6.51
All Regional Commute Changes					
14-year evaluation period	NA*	53,813	913,203	.929	1.26
7-year evaluation period	NA*	71,363	1,235,292	1.25	1.52

*Commuter placements are defined as the number of commuters placed in alternative modes. Because this approach includes all regional commuters, both from the 14-year and 7-year evaluation period, commuter placements are not applicable.

Alternative Mode Changes and Attribution to VMEPs – This second approach estimates impacts for commute changes associated with alternative mode switching, where switching again was measured for both the 14-year period and the 7-year period. This approach makes the assumption that switches to drive alone should not be counted because they likely were not the result of VMEPs, but rather the result of changes in commuters’ personal circumstances (e.g., changing jobs) or other personal travel needs or preferences. Because it is possible some switches to alternative modes were motivated by non-VMEP factors, this approach takes the further step of examining why commuters made alternative mode switches and the potential influence of VMEPs on the commute changes.

The approach considered two tiers of possible VMEP influence. As shown in Table 7, Tier One influences account for the influences from direct receipt of or contact with a VMEP service or program (e.g., transit subsidy, employer commute assistance). About 22% of alternative mode switchers who made their switch sometime in the 14-year period mentioned that a Tier One item influenced their decision. The percentage was about the same (23%) among commuters who made their switches to alternative modes during the 7-year period.

TABLE 7: TIER ONE VMEP INFLUENCES

VMEP Programs and Services
Received carpool, vanpool, or transit subsidy
Received other commute service from employer
Job or employer offered or required it
Received other commute service from organization that provides commute information or services
Saw, heard, or read radio, TV, or newspaper ad about commuting, commute options*
New mass transit line became available

*No respondents reported being influenced by a radio, TV, or newspaper ad about commuting or commute options.

As shown in Table 8, Tier Two influences account for the potential influences that might be occurring due to a VMEP message (e.g., teleworking saves time, carpooling saves money) disseminated by VMEP partners. Tier Two also includes actions that might have been indirectly influenced by a VMEP service or program (e.g., family member, friend, coworker wanted to carpool). About 40% of the commuters who made alternative mode switches during the 14-year period mentioned a Tier Two influence. Again, the percentage was about the same (42%) for commuters whose alternative mode switch occurred during the 7-year evaluation period.

TABLE 8: TIER TWO VMEP INFLUENCES

VMEP Messages and Other Indirect Influences
Concerned about the environment
Didn't want to drive, traffic was worse
Wanted to save money
Wanted to save time
New type of transportation became available
Spouse or family member, friend, coworker wanted to carpool
Like being able to work at home and having more time with family

It is important to note that the Tier One and Tier Two categories might exclude some of the subconscious effects or indirect impacts of VMEPs that are not immediately evident or obvious to individuals making commute changes. It is possible that some commuters are prompted to make commute changes, but are not fully aware of the influences (either influences on them or on a rideshare partner) that led to the change. But, by including Tier Two reasons in the count of influenced commuters, it is likely that at least some of these “unaware” commuters are captured as “indirectly influenced.”

It is also possible that some impacts counted under Tier Two could have no connection with the VMEPs at all. For example, shifting to the train because traffic is worse was not necessarily the result of hearing or seeing a VMEP message about traffic. It could be simply that some commuters made the connection between train and avoiding traffic or between a carpool and saving money without any direct or indirect VMEP influence. In this way, Tier Two could capture some impacts that were not truly VMEP induced.

It is also important to note that some of the Tier One and Tier Two influences may already be included in the regional travel demand model for the region, and thus might already be counted in the VMEP target baseline assessment. Examples of this could be a new transit line becoming available (Tier One VMEP Influence) or a new type of transportation becoming available (Tier Two VMEP Influence). The measurement team did not discount for this potential overlap, but has pointed out to both EPD and GDOT that this may be the case.

Impact results for this approach are shown in Table 9 and results fall short of all VMEP targets. However, the results are much closer than the approach presented in Table 11, in which VMEPs not only have to meet the SIP target for new shifts to alternative modes, but also must absorb the negative impacts that result when commuters who were using alternative modes at the baseline year shifted away from alternative modes to driving alone.

**TABLE 9: DAILY TRAVEL AND EMISSION REDUCTIONS FOR ALTERNATIVE MODE COMMUTE CHANGES AND
ATTRIBUTION TO VMEPS**

	Commuter Placements	Daily Vehicle Trips Reduced	Daily Vehicle Miles Reduced	Daily NO_x Reduced (tons)	Daily VOC Reduced (tons)
VMEP SIP Targets	147,384	294,768	4,421,487	4.28	6.51
Alternative Mode Commute Changes Attributable to VMEPs					
14-year evaluation period	260,201	176,707	3,235,514	3.24	3.93
14 year – Tier 1	92,276	62,666	1,147,419	1.15	1.39
14 year – Tier 2	167,925	114,041	2,088,095	2.09	2.54
7-year evaluation period	252,113	169,289	3,169,083	3.18	3.85
7 year – Tier 1	89,709	60,238	1,127,649	1.13	1.37
7 year – Tier 2	162,404	109,051	2,041,434	2.05	2.48

SECTION 3 FY2004 ATLANTA TDM PROGRAM EVALUATION

PURPOSE

GDOT is leading an effort to coordinate and maximize the effectiveness of TDM related Congestion Mitigation and Air Quality Improvement (CMAQ) funded projects and other federal, state, and privately funded projects in the 13-county nonattainment area. A primary component of this effort is an annual evaluation to measure travel and emission reductions for commuters who participate in TDM projects that receive CMAQ funds. The organizations participating in the evaluation are referred to as the Atlanta TDM Program and are VMEPs.

While the annual Atlanta TDM Program evaluation is not conducted for the VMEP target assessment specifically, the measurement team has included it in this report as support data for the regional switcher survey commute travel and emission reduction findings. The measurement team cautions EPD against relying on the Atlanta TDM Program evaluation for the VMEP target assessment. The evaluation includes only the programs that can be validated with established data sources, and thus represents a conservative, lower bound estimate of commute related travel and emission reductions. In addition, the evaluation represents alternative mode use over a shorter time period than the VMEP target evaluation period in the SIP (1990 baseline).

The full FY2004 Atlanta TDM Program Evaluation Report can be found in Appendix B. A summary of the programs included in the evaluation report and the overall travel and emission reductions is presented below.

METHODOLOGY

The measurement team based the Atlanta TDM Program evaluation on participant data for carpooling, vanpool, transit modes. The measurement team used the following four programs to determine the travel and emissions reductions achieved:

1-87-RIDEFIND

The Atlanta Regional Commission's 1-87-RIDEFIND Rideshare Program is a regional support program of the Atlanta TDM Program used by The Clean Air Campaign and TMAs. Participating commuters are registered in the rideshare database and either received information on ridesharing, such as a list of people they could call as potential carpool partners, or information about the Guaranteed Ride Home program. Commuter placements include those participants who either shifted to alternative modes or increased their use of alternative modes during the evaluation period or were already using alternative modes but who said they started using these modes before the evaluation period. Commuter placement data is collected as part of a biennial rideshare placement survey conducted by the CTE measurement team.

Vanpool Riders

Vanpool riders include participants riding in vans operated by either Douglas County Rideshare, Georgia Regional Transportation Authority (GRTA), or VPSI, Inc (MetroVanpool). The Clean Air Campaign, TMAs, and 1-87-RIDEFIND are responsible for helping place many of the riders in vendor vans.

Monthly Transit Pass Users

Monthly transit pass users include commuters purchasing monthly passes from the following transit agencies:

- Metropolitan Atlanta Rapid Transit Authority (MARTA)

- Clayton County Transit (C-Tran)
- Gwinnett County Transit (GCT)

TMAs sell the majority of monthly transit passes, however, passes sold by GRTA and MARTA directly are also included in the travel and emissions estimate.

Clean Air Campaign Cash for Commuters Participants

The Clean Air Campaign Cash for Commuters (CFC) program is a regional incentive program that rewards solo commuters who switch to a commute alternative for a specified period of time. The Clean Air Campaign and TMAs have launched three waves of the program since October 2002, each lasting approximately six months. The CTE measurement team tracked short- and long-term behavior changes associated with the program in FY2003 and FY2004.

TRAVEL AND EMISSION REDUCTIONS

Using these program level data collection activities, the measurement team identified the number of commuters using commute alternatives associated with the Atlanta TDM Program during FY2004. The resulting travel and emission reductions are presented in Table 10. The travel and emission reductions include commuters who began using alternative modes or increased their frequency of alternative mode use during FY2004 and commuters who began using alternative modes prior to the FY2004 and maintained use of those alternative modes during the year. The reductions also account for potential overlap within the programs.

As shown in Table 10, the vehicle trips, vehicle miles, NO_x, and VOC reductions for the annual Atlanta TDM Program evaluation fall short of the VMEP targets; however, they do show that a significant amount of travel and emission reductions are directly attributable to these programs.

TABLE 10: FY2004 ATLANTA TDM PROGRAM EVALUATION – DAILY TRAVEL AND EMISSION REDUCTIONS

Impact Measure	Atlanta TDM Program
Commuter placements	43,575
Daily vehicle trips reduced	41,021
Daily VMT reduced	885,791
Daily NO _x emissions reduced (tons per day)	.7219
Daily VOC emissions reduced (tons per day)	.8755

Source: FY2004 Atlanta TDM Evaluation

SECTION 4 CONCLUSIONS

While the travel and emission reductions estimated from the 2004 evaluation approaches fall short of the VMEP targets, it does not mean that VMEP programs are not successful or effective at reducing traffic congestion and improving air quality in the 13-county Atlanta nonattainment area.

As demonstrated in the annual Atlanta TDM Program Evaluation, these programs continue to contribute to travel and emission reductions. For example, in 2002, the Atlanta TDM Program Evaluation was reducing approximately 780,000 vehicle miles per day. In 2004, the daily vehicle mile reduction estimates increased to nearly 886,000 miles per day.

The VMEP shortfalls likely have more to do with the difficulty in respondents' ability to recall the commute changes they have made over such a long period of time (since the SIP baseline year of 1990) and to identify why they have made commute changes in the first place (i.e., indirect and subconscious affects). Research shows that many commuters are prompted to make commute changes, but are not fully aware of VMEP influences on them or on their rideshare partners.

In addition, the 2004 estimate does not include potential impacts from non-commute travel changes. Non-commute data collected as part of the 2002 assessment indicated metro Atlanta residents make significant changes in non-commute travel each year. However, the measurement team was unable to collect non-commute data for the 2004 assessment, primarily because of data reliability concerns and the resources needed to accurately assess non-commute trip purposes.

Perhaps the most accurate measure of the VMEP target would be to collect commute and non-commute travel related data from the over 600 employer and property manager partners participating in VMEP programs across the Atlanta nonattainment area. However, the costs associated with conducting such an analysis is also cost prohibitive.